IMPERIAL
DEPARTMENT OF AGRICULTURE
FOR THE WEST INDIES.

IMPERIAL BUREAU
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REPORT

ON THE

AGRICULTURAL DEPARTMENT, ST. VINCENT,

FOR THE YEAR

1928.

TRINIDAD.
ISSUED BY THE IMPERIAL COMMISSIONER OF AGRICULTURE
FOR THE WEST INDIES.

1929.

[Price Sixpence.]

REPORTS

ON THE

BOTANIC STATION, ECONOMIC PLOTS, AND AGRICULTURAL EDUCATION, ST. VINCENT.

Annual Reports on certain Economic Experiments conducted in connexion with the Botanic Station, 1900–2.

Annual Reports on the Botanic Station for the years 1901 and 1902.

Annual Reports on the Botanic Station, Economic Experiments, and Agricultural Education for the years 1902–3 to 1918–28.

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1929.

LETTER OF TRANSMITTAL.

C. A. 207.

TRINIDAD,
28th May 1929.

Sir,

I have the honour to transmit the Report of the Agricultural Superintendant on the working of the Agricultural Department, St. Vincent for the year 1928.

2. The report indicates that the amount of the rainfall for the year at the Botanic Gardens was very slightly above the average for 34 years. The amount of rain received in October and November was excessive, being some 34 inches for the two months. This heavy rainfall coming at the time when the cotton was developing its bolls, resulted in heavy losses and the short cotton crop for the year is prabably very largely due to the heavy rainfall and excessive humidity at this critical time.

3. It is hoped that the change in the time of planting from June to September, which will be made this year, will enable the cotton plant to develop its bolls under more favourable conditions in the present and succeeding years.

4. The development of a local avocado pear by the selection of a suitable native variety and its propagation by budding and grafting is a sound line of work.

5. Arrowroot continues to hold the first place in the value of its exports and it is encouraging to note that increased sales appear to be resulting from the exploration of the markets of the United States of America, and Canada. The export of cotton shows a falling off, the amount exported being less than in any year in the ten-year period for which figures are given, except 1922. Syrup and sugar were exported to the value of £23,671, which was a considerable increase over the value of the exports for 1927. Coconuts and copra again show an increase in the value of exports.

6. Crop conditions generally were fairly satisfactory during the year, and the several minor crops of the island about held their place in the amount of crops produced or in the value of the exports.

7. A further report on a sample of Manila Hemp sent to the Imperial Institute confirms the impression that a good quality of this fibre can be produced in St. Vincent, and it is noted that in an extensive nursery the Agricultural Department bas a considerable amount of planting material of Manila Hemp for distribution

8 Each year the report of the Agricultural Superintendent contains references to the carelessness or wilful neglect of cotton growers in St. Vincent to take the precautions or apply the remedies which are well known to be necessary to control the insect pests of cotton or to prevent their development. The proper cleaning up at the end of the crop, the careful burying of the cotton seed or cotton seed meal used for fertilizer in any field and the prompt application of Paris Green for the control of the cotton caterpillar should be recognised by all cotton growers without the need of suggestion or compulsion from Agricultural Officers or others.

9. The report on the Agricultural Credit Societies shows no improvement in the condition of these societies, and the Agricultural Superintendent states that the winding up of the affairs of some of these should be considered.

10. The report on the working of the Government Cotton Ginnery for the year ended 30th September, 1928, shows that the amount of cotton ginned was less than in the previous year. The crop of 1927-28 was smaller than that of 1926-27 on account of a considerable reducton in the area planted with cotton and the yield per acre was small as a result of unfavourable weather.

11. The Government Granary appears to have handled a smaller amount of corn (maize) than usual. The Grenadines crop suffered from severe drought and a large part of the St. Vincent crop was sold to those islands direct, without being kiln-dried or going into store.

12. The report on the whole records a satisfactory state of affairs in St. Vincent, which is fortunate in having a well diversified Agricultural practice, at a critical period like the present, when certain staple crops are being sold in the World's markets at less than the cost of production.

I have the honour to be,

Sir,

Your most obedient servant,

(Sgd.) H. A. BALLOU,
Commissioner of Agriculture,
Imperial College of Tropical Agriculture.

His Honour,
THE ADMINISTRATOR,
St. Vincent.

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Staff of The Agricultural Department, St. Vincent.

Agricultural Superintendent and Inspector, Agricultural Credit Societies	T. P. JACKSON.
Cotton Inspector and Government Vaccinating Officer ...	L. BROWN.
Foreman, Experiment Station and Agricultural Instructor	F. A. SIMMONS.
Foreman, Botanic Station and Inspector, Cotton Stainer Control to February 29th	P. BRANCH.
Foreman, Botanic Station and Inspector, Cotton Stainer Control from March 1st	R. VANLOO.
Officer in Training to February 29th	R. VANLOO.
„ „ „ from April 1st	B. ISAACS.
Clerical Assistant	Miss D. E. WALL.

REPORT ON THE AGRICULTURAL DEPARTMENT, ST. VINCENT.

FOR THE YEAR ENDED DECEMBER 31st, 1928.

Work in the Botanic Gardens and Observations on Plants.

The rainfall for the year was 103·86 inches. As the average for 35 years works out at 102·53 inches, the year can be regarded as normal as far as quantity precipitated is concerned. In another section of this report the damage caused by rain to the cotton crop is discussed. St. Vincent was particularly fortunate in that it escaped the disastrous hurricane which swept over some of her sister colonies.

During the year several efforts were made to improve the appearance of the Botanic Gardens. The beds in the Rose Garden were replanted. Unfortunately, very heavy rain was experienced soon after the roses were set out which caused the death of a portion of them; they are being replaced. A variety of rose locally known as "Woban" had almost taken possession of these beds. As this is particularly hardy, it was probably a case of the survival of the fittest.

The avenue of false Sago Palms, (*Cycas circinalis*) that were growing on each side of the road leading from the bridge to the main entrance gate, was destroyed and replaced by plants of *Thysanolaena agrostis* which is locally known as Pampas grass. This has much improved the appearance of that part of the Gardens.

The earth drain in front of the Agricultural Superintendent's Quarters was converted into a concrete one. In the same part certain flower beds were rearranged and others made.

The grafted mango trees growing on each side of the Central Walk were heavily pruned during the year. This was done to open vistas in the Gardens and the object was successfully attained.

The summer house was repaired and painted during the year.

A considerable amount of work has been done in the St. Vincent Botanic Gardens during the past few years. This was (at the time of its performance) unobtrusive in nature, but the cumulative effect enhances their natural beauty.

In the report on this Department for 1927 the question of the possibility of exporting mangoes to Canada was discussed. It is now proposed to say a few words concerning Avocado pears. The question of varieties is by on means a settled one. Some time ago the writer instituted a search for one possessing good all round qualities. Such was found growing in a peasant's garden situated some three miles from Kingstown. The fruit of this is some seven inches in length, having firm flesh of some two inches or more in thickness which possesses a rich nutty flavour. It has a seed that fully fills the cavity of the fruit and the skin is of a greenish brown colour somewhat thin but tough. This Avocado undoubtedly possesses commercial possibilities, and will be propagated for distribution purposes.

Avocado pears do not breed true to seed, and shield budding or splice grafting has to be resorted to for propagation purposes. Inarching would perhaps be simpler for anybody not skilled in the work. The selection of budwood is an important point, and this should be taken from the tips of branches, round or semi-round of green colour with healthy, well developed buds. Cutting back the top of the stock must be done cautiously as plants are liable to die back.

There should be no great difficulty in connection with the shipping of this fruit if care is taken in handling. It should be removed from the tree a short time before maturity by carefully cutting through the swollen portion of the stem

immediately above the fruit. Pears should be packed in standard Tomato crates, the number of fruit per crate varying according to size, each layer being protected by proper packing material above and below. At times, Avocado pears, arriving in good condition in Northern markets, bring fancy prices.

Bougainvillaeas.

The plant from the cross mentioned in the 1927 Report was lost during the year. It was probably stolen. Other bougainvillea crosses have been made but it is too early to comment on these.

Plant Importations.

The following plants were imported during the year :—*Hibiscus cannabinus, L., Bimlipatum jute, Hibiscus esculentus, L.*, Ochro *Abutilon sp.* and *Passiflora edulis*, Purple Bell-apple. The first three mentioned made poor growth and the capsules were all attacked by pink bollworm. *Passiflora edulis* made good growth.

Three varieties of tomatoes were imported and tried during the year. These were Winsall, Coopers Special, and Ponderosa; all were obtained from New York. Winsall proved a failure during the wet season; it was almost defoliated by Septoria Leaf Spot. In dry weather the Leaf Spot does not affect it, nor yet is it susceptible to Blossom End Rot. It appears to be a good variety for growing in dry weather. Coopers Special bears fruit in the wet season and appears more immune to Bacterial Wilt than the others. In dry weather the tomatoes were severely attacked by Blossom End Rot. The fruits are not as large as the previous mentioned variety; they are attractive and possess the reputation of being being shippers. Ponderosa was very susceptible to Wilt disease.

Work in Nurseries and Distribution of Plants.

The following is a list of plants, seeds, etc., distributed from the nurseries attached to the Botanic and Experiment Stations :—

Economic and Decorative Plants.

Papaw	500
Miscellaneous decorative	297
„ ecenomic	58
Coco-nut	41
Grafted mango	16
	912

Cuttings.

Cane varieties	34,100
Sweet potato	13,040
Cassava	200
	47,340

Seeds.

Cotton	783 lb.
Arrowroot rhizomes	400 „
Yams	285 „
Grounds-nuts	100 „
Eddoes	42 „
Pigeon Peas	20 „
	1,630 lb.

There was, as foreshadowed in the Report for 1927, a further decrease in the number of coco-nut plants distributed. In point of fact fewer plants of all kinds were sent out during 1928 than during the previous year. The reason for this is that planters are establishing their own coco-nut nurseries and in this way raising plants to meet their own requirements.

A large number of seedling canes were raised. At the time of writing most of these are in bamboo pots. Of those propagated in 1927 there were retained for trial purposes :—

From V. 2406 to V. 2520, the female parent being B. 6032.
„ V. 2525 „ V. 2550, „ „ „ „ B.H 10 (12)
„ V. 2558 „ V. 2603, „ „ „ „ Bourbon.
„ V. 2606 „ V. 2802, „ „ „ „ a St. Vincent Variety V. 407.

Inspection and Fumigation of Imported Plants and Seeds.

The following is a list of plants, etc., which were imported and fumigated under the Importation of Plant Diseases Protection Ordinance, 1906 :—

Pine apple plants	... ...	200
Ornamental „	... ...	10 boxes.
„ „	... ...	4 parcels.
Fibre, plant, seeds	... ...	1 parcel.
Vegetable and flower seeds	... ...	27 parcels.
Bulbs (ornamental)	... ...	3 „
Tomato seeds	... ...	2 „
Broom corn	... ...	1 parcel
Bird seeds	... ...	1 „

Manurial Experiments at the Experiment Station.

Sea Island Cotton.

This series of manurial experiments with Sea Island Cotton has been conducted for the past seven years and during that period no variation in the manurial treatment accorded the plots has taken place. The plots are $\frac{1}{40}$ acre in area, rectangular in shape, and there are five series, each repeated four times.

The manurial treatment received by the plots was as follows :—

Series 1	...	Control ; no manure.
„ 2	...	Pen manure at the rate of 10 tons per acre.
„ 3	...	Green dressing.
„ 4	...	„ „ and potash calculated as K_2O at the rate of 50 lb. per acre.
„ 5	...	Green dressing and high grade Nitrapo at the rate of 2 cwt. per acre.

When the Report for 1927 was being written no figures for that year were available. These with those for 1928 are incorporated in the results.

The mean results for the past seven years show that the returns from the plots in series 2 gave an average increased yield of 38 per cent over the control plot. In the series which received green dressing only, the increase amounted to 11 per cent. The plots which received green dressing and potash gave an increased return of 45 per cent. The average return from series 5 shows an increased average return of only 9 per cent.

Soft rot of bolls was very common on the plants growing in these plots for the past two years, and this has helped to mask results.

If we take 10 tons of pen manure as representing the average amount of organics that is generally applied to land in which cotton is grown in St. Vincent, and it seldom gets more, we see that an application of green dressing plus potash will maintain soil fertility, as well as, and perhaps even better than applications of pen manure. As time progresses this point will probably become more pronounced.

Maize (Indian Corn.)

Manurial experiments with maize have been conducted during the past seven years. The manurial treatment has been the same each year, and the area of each plot being 240 square feet. There are seven series, each being in duplicate. The following gives the manurial treatment of the plots :—

Series	1	... No manure.
,,	2	... Nitrogen, 30 lb. per acre as sulphate of ammonia.
,,	3	... Potash, 30 lb. ,, ,, ,, ,, ,, potash.
,,	4	... Nitrogen and potash as above.
,,	5	... Cotton seed meal, 1,000 lb. per acre.
,,	6	... Potash as above, cotton seed meal as above.
,,	7	... Pen manure, 20 tons per acre.

In the following table the average percentage increase over the no manure plots is given. The figures are for seven years.

TABLE.

Series.	Percentage increase over no manure plot.	Series.	Percentage increase or decrease over no manure plot.
2	+ 14	3	— 4
4	+ 26	5	+ 3
6	+ 23	7	+ 32

The average increase returns from the pen manure plots were appreciable, *i.e.*, 32 per cent. The increased returns from the plots receiving nitrogen and potash were some 26 per cent. It is interesting to compare the results from series 5 and 6; the application of potash and cotton seed meal resulted in an increased yield of 23 per cent, and cotton seed meal alone, 3 per cent. Potash, when applied alone appeared to have a depressing effect. It is the local custom to grow maize in conjunction with cotton and applications of pen manure can be safely recommended for land in which these crops are grown.

Sugar Cane and Ground Nuts.

Manurial experiments with sugar cane and ground nuts were carried out. The trials with sugar cane indicated that increased yields may be looked for when organic manure is used. The results from the experiments with ground nuts were negative. They were not sufficiently important to warrant the giving of details which would be decidedly lengthy.

Sugar Cane Variety Experiments.

These trials were conducted on Dauphine Estate, the property of Dr. Stoute, situated some 6 miles from Kingstown. The plots, with two exceptions, were in duplicate, the exceptions being V. 1,800 and Bourbon. The varieties were grown in rows, and each plot was $\frac{1}{40}$ acre in area, the canes being planted 4 ft. × 4 ft. The method of reaping and testing was similar to that practised in previous years. The canes from each plot were cut and weighed, and 100 lb. of cane from each variety were taken to the estate mill, the juice extracted and weighed. Samples of the juice of each were tested for density by means of a Brix Hydrometer. As is well known, such tests are not absolutely correct, as the total solids in cane juice are not entirely sugar. They are, however sufficiently correct for practical purposes. The results are put forward in tons of cane per acre, gallons of juice per acre, gallons of juice per ton, sucrose, lb. per gallon in juice, and sucrose, lb. per acre in juice. Much of the information appearing below was obtained by using the tables dealing with the specific gravities of cane juice, which appears in the West Indian Bulletin Vol. 14, page 193.

The canes were planted on June 23rd, 1927 and reaped on November 23rd—27th, 1928. When planted they received pen manure at approximately 10 tons per acre, and subsequently in July, sulphate of ammonia at the rate of 2 cwt per acre. Results appear in the following table :—

TABLE I.

VARIETY.	Mean of 2 plots of cane.	Juice.		Sucrose.	
	Tons per acre.	Gallons per acre.	Gallons per ton.	lb. per gal. of juice.	lb. per acre in juice.
1. B.H. 10 (12) ...	31·63	4,242	133·9	1·892	7,993
2. V. 1800 ...	30·09	3,890	125·9	1·846	7,180
3. B.S.F. 12 (27) ...	24·80	3,330	134·3	1·863	6,203
4. B. 11569 ...	23·96	3,054	127·5	1·966	6,094
5. B. 6032 ...	25·40	3,192	127·4	1·863	5,950
6. V. 154 ...	24·43	3,120	126·9	1·829	5,893
7. B. 163 ...	23·00	2,953	128·2	1·817	5,345
8. Sealey Seedling ...	22·73	2,946	131·9	1·801	5,251
9. V. 99 ...	19·35	2,527	130·3	1·812	4,580
10. V. 164 ...	16.90	2,253	133·9	1·926	4,160
11. B. 6450 ...	18·35	2,411	132·0	1·687	4,120
12. Waterford No. 2 ...	14·35	2,650	141·2	1·738	3,366
13. B. 6308 ...	12·11	1,646	136·1	1·586	2,611
14. B.S.T. ...	10·35	1,325	127·4	1·967	2.587
15. Bourbon ...	9·01	1,235	135·7	1·789	2,210

In the following table the varieties are placed in the order of merit taken by them in the above experiments and similar ones conducted in the past.

TABLE II.

VARIETY.	Position when 15 varieties were grown. 1928.	Position when 14 varieties were grown. 1925.	Position when 18 varieties were grown. 1924.	Position when 16 varieties were grown. 1923.	Position when 16 varieties were grown 1922.
B.H. 10 (12) ...	1st	11th	12th	13th	3rd.
V. 1800 ...	2nd	...	...	...	...
B.S.F. 12 (27) ...	3rd	...	6th	2nd	15th
B. 11569 ...	4th	1st	1st	5th	1st
B. 6032 ...	5th	5th	10th	...	7th
B. 154 ...	6th	...	8th	11th	...
B. 163 ...	7th	2nd	4th	7th	5th
Sealey Seedling ...	8th	3rd	5th	1st	12th
V. 99 ...	9th	4th	2nd	...	...
V. 164 ...	10th	6th	13th	6th	6th
B. 6450 ...	11th	9th	3rd	10th	11th
Waterford No. 2 ...	12th	12th	15th	15th	16th
B. 6308 ...	13th	...	7th	15th	8th
*B.S.T. ...	14th	7th	...	9th	14th
Bourbon ...	15th	...	...	...	...
Ba. 1279 ...	...	10th	...	...	...
V. 1 ...	...	14th	...	...	...
V. 70 ...	...	...	17th	...	...
B.S.F. 12 (45) ...	...	...	18th	3rd	13th
Ba. 7924 ...	...	...	16th	14th	9th
B. 147 ...	...	...	14th	4th	2nd
Ba. 12079 ...	...	...	11th	8th	4th

* BlackSavage Transparent.

From the above we see that B.11569 took first place in the experiments on three occasions and fourth and fifth place on one. This cane is popular with St. Vincent planters, and is one that can be recommended with a fair amount of confidence for general planting purposes. In some parts, however, it has the reputation of possessing indifferent ratooning powers.

B.H. 10 (12) came first in 1928 and third in 1922. It took low positions during the three other years of experimentation. The writer's experience of this cane is that it is not so dependable as the former, but with rich soil and good rainfall, returns above the average are often obtained.

On one occasion Sealey Seedling came first; its position in the other trials were third, fifth, eighth and twelfth. It has the reputation of being a hardy variety, standing up moderately well to adverse soil and weather conditions. It cannot, however, be recommended for general planting purposes in this island. This cane is at its best on a heavy soil.

V. 1800 looks as though it may be promising but it is too early to say anything definite about this.

The behaviour of B.S.F. 12 (27) was erratic, the places taken by it were 2nd, 3rd, 6th and 15th.

The only other variety which needs comment is B. 147. This takes longer to mature than most varieties and it is a slow growing cane in its young stages. These traits in its character handicap it when tested against quicker growing sugar canes.

Ground Nut Varietal Experiments.

These plots were planted on August 1st and reaped on December 15th. Four plots of each variety were grown, and the results appearing below are calculated to yield of dry nuts per acre. Each plot was 240 square feet in area.

TABLE III.

Variety.	Plot 1.	Plot 2.	Plot 3.	Plot 4.	Mean.	Increase on local variety.
Local ...	908	1,452	1,089	1,271	1,180	...
African ...	1,452	1,634	1,271	1,089	1,362	182
Improved ...	1,271	1,452	1,271	1,271	1,319	139
Virginia ...	908	1,452	1,452	1,271	1,271	91

We see from the above that the imported varieties gave a yield some 15, 12 and 8 per cent greater than the local variety. The varieties African and Improved are worthy of a trial by planters, and a limited quantity of planting material is available for any person who is desirious of trying these varieties.

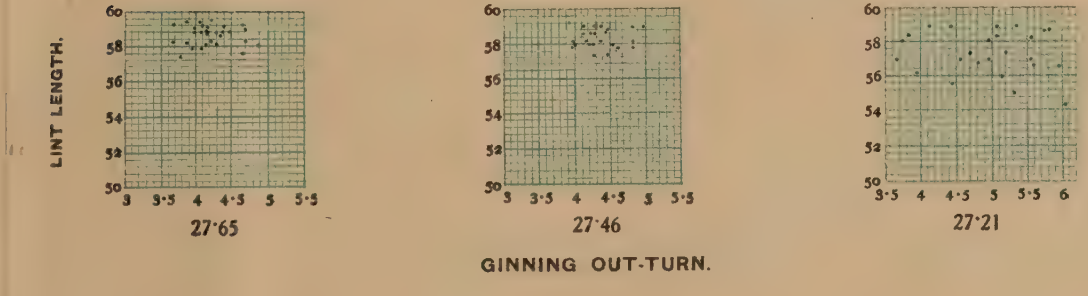
Cotton Selection.

The quantity of seed cotton from the selections commented on in the 1927 Report was not enough to work on. This was due to Soft Rot of bolls. On account of this, sufficient time was available to examine certain cotton crosses growing at the Experiment Station; these did not suffer to the same extent from the disease. The crosses were made by Dr. Harland some nine or ten years ago and flowers had been annually self fertilised. The crosses were made between V. 135 and H. 13. V. 135 is the finest cotton in St. Vincent and H. 13 is a Montserrat type with a reputation for heavy yields. Target diagrams were made from data obtained from some forty of these. The method of making diagrams is put forward in "The Development and Properties of Raw Cotton" by W. M. Balls, *M.A.*, which is as follows:—"There is a very simple way of presenting data for variety composition in respect of two commercial characters simultaneously, based on the statisticans' Correlation Diagrams, which we may term Target Diagrams, since the scatter of dots over the diagram is used in the same way as

the shot-pattern of a shot-gun. We have seen that all these measurable characters, such as lint length and ginning out-turn, fluctuate to a definite degree round a mean value, within a pure strain. If, therefore, we grow a family of pure strain plants, under uniform treatment, and determine the out-turn and length for each plant in a certain period of the season, we can draw curves showing the distribution of the varieties in each respect through a family. If we now place these curves on two adjacent sides of a square, we can make a target diagram in the following way. Find the position of plant No. 1 in the length curve, and draw a line into the square at right angles to the side along which the length curve is plotted. Then repeat the process with the out-turn curve. At the point of intersection of these two lines make a conspicuous dot. Repeat the process for each plant when it will be found that the group of dots thus made will give a picture of the amount of " scatter " in both characters at once, instead of only showing one at a time".

" If we are handling a pure strain in this way, the scatter in either character will be definitely regular, and the dots will form (with suitable plotting) a circular group, the center of which is densely dotted, while the dots become fewer and fewer towards the margin of the group. The centre of the group lies at the mean for each character".

Target Diagram Showing Composition of Three Strains.



Above is shown three scatter diagrams. The first and second are the best of the forty examined and indicate the strains are approaching purity. The third shows an irregular scatter and is merely put forward to indicate the difference. If these are held some distance away from the eye, two of the targets are visible; the other has the dots so widely scattered as to be almost invisible.

Lint from the two strains 27·65 and 27·46 will be sent for spinning tests in the near future; they may prove valuable acquisitions.

Yams Varietal Experiments with Staked and Unstaked Plants.

Eight plots of nine varieties of yams were grown during the year. Half of these were staked and half were not. The only manurial treatment accorded the plots was applications of Gliricidia prunings; the plots were planted on June 12th and reaped on December 12th ; they were planted 4ft. × 2 ft. In the following table the results are given:—

TABLE

Variety.	Plot A lb. per acre.	Plot B lb. per acre.	Plot C lb. per acre.	Plot D lb. per acre.	Mean.	Difference on Unstaked.	Order of merit for yield.
Seal Top Staked ...	6,534	7,623	5,445	7,442	6,761	...	2
Unstaked ...	5,808	4,538	6,171	5,264	5,445	1,316	...
Bottle Neck Lisbon Staked ...	12,161	6,534	10,890	13,250	10,709	...	1
Unstaked ...	11,798	5,808	9,256	7,623	8,621	2,088	...
Danish Staked ...	5,626	5,263	5,263	4,900	5,263	...	7
Unstaked ...	5,808	3,993	3,085	4,719	4,401	862	...
Crop Staked ...	7,623	5,808	6,352	4,900	6,171	...	5
Unstaked ...	5,808	6,171	5,263	1,270	4,628	1,543	...
Light Red Staked ...	6,715	4,356	6,897	4,900	5,717	...	6
Unstaked ...	4,174	4,719	4,537	2,178	3,902	1,815	...
Bugle Horn Staked ...	4,900	3,267	3,993	6,897	4,764	...	9
Unstaked ...	2,722	3,448	1,452	2,541	2,541	2,228	...
Horne Staked ...	8,530	4,174	3,811	10,345	6,715	...	3
Unstaked ...	5,263	3,811	1,633	4,537	3,811	2,904	...
Oriental Staked ...	7,804	7,078	4,900	5,263	6,261	...	4
Unstaked ...	5,082	5,808	908	3,267	3,766	2,495	...
Lisbon Staked ...	4,937	4,719	6,897	4,719	5,218	...	8
Unstaked ...	4,537	5,263	5,263	4,900	4,991	227	...

It will be seen that the staked plots gave in every instance increased yields over those that were not staked, and the question arises as to whether these would be of greater value than the cost of staking. It is suggested that they would, for a cheap way to supply stakes on which the plants could climb would be to grow a crop of corn through them. This would answer the purpose; in point of fact it is done at times in some peasant holdings.

Work connected with Insect and Fungus Pests and their control.

The Cotton Worm (*Alabama argillacea*, Hubn.)

Attacks of cotton worm were experienced during the year. These were not as bad as those of 1926. The 1928 attack is discussed in the section "Cotton Industry".

The Pink Bollworm (*Platyedra gossypiella*).

During the season 1928–29 pink bollworm larvæ were found at the Eexperment Station, on the petals of shed cotton flowers as early as August. The reason for this may be accounted for by the fact that no period of fallow followed the destruction of the previous crop. A green dressing of Bengal beans was planted and grew rapidly; this quickly covered the soil forming conditions which enable the insect to carry over in quantities. The brood was destroyed by the simple method of collecting and destroy by fire all cotton flowers that were shed. The damage done to cotton at the Experiment Station by pink bollworm during the past season was not much greater than in any previous one.

An attempt was made to form some idea as to the degree of infestation at different periods of the year. The method adopted was to count the number of double seeds after ginning. In January it was found that the infestation was 0·17 insects per pound of seed, in February 1·71 per pound and in March 0·94 per pound. The increase from January to February was rapid, the infestation being ten times greater; from February to March the decrease was some 45 per cent.

The following table gives the figures in connection with the percentage infestation of bolls as obtained from an observation plot at the Experiment Station:—

TABLE.

Date.	Percentage infestation.	Date.	Percentage infestation.
7/10/28	4	5/11/28	23
14/10/28	2	12/11/28	17
21/10/28	1	26/11/28	26
28/10/28	4	1/12/28	98
		8/12/28	100

THE COTTON STAINER (*Dysdercus delauneyi*).

The campaign carried out for the control of this pest during the season was on similar lines to those of previous ones. It consisted of :—

a. The enforcing of a close season.

b. The trapping of pests when found in numbers.

c. The destruction of food plants.

The close season for cotton was during the months of April and May. Some difficulty even now is experienced in rigidly enforcing this. The practice of cutting down plants instead of uprooting them is becoming more common every year. In showery weather, plants so treated rapidly make second growth; some planters had to be threatened with prosecutions before the work of destruction was done satisfactorily. Owing to the ravages of other pests, the possible seriousness of leaf blister mite, which attacks second growth immediately after formation, has been lost sight of. In the early part of April several growers had not destroyed their cotton plants and were given twenty-four hours to do what was necessary. Eight growers took no notice of the warning and were prosecuted.

During March, stainers were found in moderate numbers at Richmond Hill and on an estate on the Leeward coast about six miles from town. In May, these insects were numerous in the Northern part of the island. In every instance the attacks were controlled by means of traps. It has again to be noted that cotton seed meal had been broadcasted on a field of arrowroot and no attempt was made to cover it. As soon as the fact was brought to the notice of the owner, every assistance was given the Department to rectify things.

A plot of sorrel, *Hibiscus sabdariffa, L.*, growing at the Experiment Station attracted stainers during the Close Season, at the time the plants were fruiting, and it would be interesting to know whether these insects can live and breed on sorrel. Attempts were made to find if this were possible but were not carried to a definite conclusion, as the supply of sorrel fruit did not last sufficiently long for the insects to complete their life cycle.

In the following table the stainers accounted for at the Experiment Station for six years are given. The method employed in computing these figures has been put forward in previous Reports.

TABLE.

Months.	1923.	1924.	1925.	1926.	1927.	1928.
January ...	37,878	20,086	1,449	2,850	...	29,298
February ...	63,800	2,800	7,723	...	105	7,217
March ...	51,880	930	6,231	791	1,072	909
April ...	3,002	1,225	2,400	5,136	334	42,648
May ...	817	52	716	100	3,660	...
June ...	908	...	...	...	3,060	101
July ...	550	...	...	...	...	2
August ...	87	...	1	...	...	705
September ...	3	...	1	...	...	973
October ...	8	...	...	...	...	758
November ...	...	...	...	...	...	538
December ...	377	57	550	...	150	...

Red Ring of Coco-nuts (*Aphelenchus cocophilus*).

This disease is not making any headway in St. Vincent. As new areas are annually attaining what is termed the critical period it would be well for planters to continue to maintain a careful watch for the appearance of this disease in their plantations as a series of very wet years might cause a set of conditions conducive to the spread of red ring. Planters are aware of this fact and on one large coco-nut estate it is the sole duty of four men to search for diseased trees which if found are immediately destroyed by five.

Arrowroot Worm (*Calpodes ethlius*).

During certain months of the year this worm was commonly found in fields of arrowroot. It was responsible for less damage to foliage than in some previous years. When this pest is numerous early in the season planters are advised to dust with arsenical insecticides, but there is a considerable difference of opinion among them as to whether the appearance of this pest causes decreased returns. When attacks occur late in the season the loss of crop if any is probably negligible. Should they appear early, it is reasonable to assume that the loss of large quantities of foliage will result in decreased returns.

Other Pests.

Bush Bugs (*Nezara viridula*) were found, but not in large numbers. In the past a considerable amount of work has been done in connection with the control of this pest and it has been found that possibly the best method to adopt is to keep estates free of weeds of the order Leguminosæ.

Bronze Beetle (*Colaspis fastidiosa*) was seen in fields of young cotton and was responsible for some loss. This pest annually makes its appearance about the same time each year and planters are well aware that attacks are more severe in fields that require weeding than in those in which cultural operations have not been neglected. The previous remark holds good for the fungus *Sclerotium rolfsii* which causes the death of young cotton plants and is commonly called "damping off".

Black Scale (*Saissetia nigra*) is always common on cotton plants on the Leeward part of the island during the latter end of the season. It is controlled by parasites and has never, as far as the writer is aware, got out of hand. The number of White Scale (*Hemichionaspis minor*) does not increase ; they appear to be constant. West Indian Mildew (*Ovulariopsis gossypii*) is always present during the latter end of the year, excessive moisture induces early prevalence. It was more common than usual during the season 1928–29.

Sugar-Cane.

Root disease (*Marasmius sacchari*) causes more damage to sugar-cane than is realised. The effect of this is more pronounced when the crop is grown on poor or thin soil. In fertile places this disease causes little or no damage to the crop. This fact has been brought to the notice of planters on more than one occasion.

Rind fungus (*Melanconium sacchari*) and pine apple disease (*Thielaviopsis paradoxa*) were both present. It is difficult to estimate the extent of damage done by these two disease, but it was not great.

The Weevil Borer (*Sphenophorus sericeus*) and the Moth Borer (*Diatrea saccharalis*) were noticed but not in greater numbers than formerly.

Cacao.

Phytophthora rot of cacao pods was common and Thrips (*Heliothrips rubrocinctus*) were found.

Indian Corn (Maize).

The corn ear worm, (*Laphygma frugiperda*) appeared and in some localities. Growers are generally tolerant of this pest which is due to the fact that they have been familiar with its depredations for years. Expensive methods to control this are not justifiable on account of the relatively low commercial value of the crop. There is no doubt that its habit of cannabalism does much to keep down numbers, for whenever two meet they fight and the vanquished is devoured by the victor.

Miscellaneous.

Aphis attacked a proportion of the pigeon pea crop at Bequia during the latter end of the year. This caused loss, but had control methods been undertaken they would have cost more than the crop was worth. White Fly (*Aleyrodicus cocois*) and Scale insects (*Aspidiotus destructor*) were found on coco-nut palms. Their numbers were more numerous during the dry season than during the wet. They were not responsible for any noticeable damage.

Plant and Animal legislation enacted during the year, 1928.

An amendment was made, by the Governor in Council, under provision of Section 15 of the Cotton Protection Ordinance, No. 6 of 1924, to Regulation 9 thereof. This Regulation enforced the heating of cotton seed by the Simons Patent Heater a second time before planting. The word "shall" appearing in this Regulation was altered to "may".

Experiment Station, Union Island.

No examination of Marie Galante cotton was made during the year. Sufficient material could not be obtained for the purpose.

Rainfall.

The following table gives the monthly rainfall as measured in Union Island during 1928. The readings were taken by the District Officer, Southern Grenadines.

Month.		Rainfall.
January	...	1·51
February	...	·92
March	...	·91
April	...	·00
May	...	·62
June	...	4·17
July	...	4·20
August	...	2·84
September	...	5·60
October	...	4·10
November	...	6·33
December	...	4·20
Total inches	...	35·40

Miscellaneous.

It has been demonstrated that Broom Corn will thrive in Union Island and, having this in view, successful attempts were made during the year to devise a simple apparatus which will facilitate the making of brooms from the corn. The cost of this was approximately £3 and by using it, an intelligent person can make four brooms in one hour. It takes actually 1¼ lb. of corn to make one broom and

an acre may be expected to yield 300 to 400 lb. of dry straw (heads). If imported pitch pine is used for making broom handles the cost of each stick, including cost of wood, sawing and turning is 6·7 cents. The retail price of a broom similar to those discussed, is between 48 and 60 cents.

During the year the Foreman, Experiment Station, held broom-making classes in Union Island and several people were taught how to make marketable brooms. This work will be continued during the coming year. Broom Corn seed will be distributed to peasants, and the apparatus mentioned above will be sent to Union Island. The making of brooms may not become a major industry but it may be the means of putting a little money in the pockets of peasants. The brooms made are on a par with those imported from the United States of America.

Various seeds and plants were sent during the year from St. Vincent for planting in Union Island.

Progress in Chief Industries.

Cotton Industry.

At the time of writing last year's Report, figures were not available as to returns of the 1927–28 Sea Island cotton corp but the statement was made that the yield per acre would be poor. The main reason for this was due to soft rot (*Phytophthora*). The total yield from 3,364 acres was 328,188 lb. of lint made up of 273,115 lb. of white, and 55,073 lb. of stained *i.e.*, some 17 per cent was stained.

The following table is interesting in that it shows the very considerable variations in yield of cotton between that produced on estates and that grown by peasants, also between that grown in St. Vincent and in the Grenadines.

Statement showing Production and Average yield of Sea Island Cotton in St. Vincent and the Grenadines for the Season 1927-28.

Particulars.	Yield lb.	Acreage.	Average yield of lint per acre lb.
Colony's total production ...	328,188	3,364	97·5
Various estates in Colony ...	222,622	1,769	125·8
Peasants in Colony ...	105,566	1,594	66
Estates and peasants in St. Vincent ...	322,521	3,110	103·7
,, ,, the Grenadines	5,667	253	22·4
,, St. Vincent ...	220,009	1,656	132·8
Peasants, St. Vincent ...	102,512	1,454	70·5
Estates, Grenadines ...	2,613	113	23
Peasants, ,, ...	3,054	140	29
Estates and peasants, Bequia ...	3,861	183	21

The area under cotton for the season 1928–29 amounted to 4,381 acres, of which 3,386 were under Sea Island and 995 under Marie Galante. This area is very much on a par with that of the previous season. Following the procedure of former years, the appended tables are given. They indicate the number of peasant and estate growers of cotton for the season 1928–29, and for the sake of comparison figures for 1927–28 are given.

TABLE 1.

1927–28.

			Sea Island, Acres.	Marie Galante, Acres.
1,561	Peasants, St. Vincent	...	1,455	...
172	„ Bequia	...	139	...
			1,594	
235	„ Union Island	...	...	656
37	„ Canouan	...	...	78
2,005				
40	Estates, St. Vincent	...	1,657	...
4	„ Grenadines	...	113	...
4	„ „	...	...	260
48			3,364	994

TABLE 2.

1928–29.

			Sea Island, Acres.	Marie Galante, Acres.
1,256	Peasants, St. Vincent	...	1,373	...
30	„ Bequia	...	24	...
2	„ Battawia	...	2	...
			1,399	
212	„ Union Island	...	..	652
44	„ Canouan	...	...	83
1,544	„			
45	Estates, St. Vincent	...	1,965	...
1	Estate, Grenadines	...	22	...
2	Estates „	...	..	260
48			3,386	995

It will be seen that there was a decrease of 445 peasant cultivators of Sea Island cotton with a reduced acreage of 195 acres when compared with the previous season.

At the time of writing figures are not available as to returns for the yield of Sea Island cotton for the season under review but only a poor one can be expected. The main reason for this was attacks of cotton worm, (*Alabama argillacea*) and the incidence of soft rot *Phytophthora*. In August a few caterpillars were found and immediately a notice was published in the local newspapers warning planters of possible impending attacks, and at the same time suggesting that necessary preparations be made to meet them. The attacks spread in a gradual manner during the months of September, October and November. These insects were first noticed in the Southern part of the island and gradually spead to high Windward and to the cotton growing on the Leeward side. Some few planters did attempt control measures but they were not of a very determined nature. There were ample supplies of insecticides available. At times rain made dusting almost impossible ; this was especially pronounced during the month of November. As before stated planters were warned of impending attacks and the Department made sure that there was sufficient insecticide in the island to combat any normal attack. In addition, when these materialised, visits were made to estates and holdings and demonstrations given in the fields as to how the insecticide was to be applied.

Cotton caterpillars were responsible for material damage to the crop. The

wholesale destruction of cotton bolls by soft rot took place during the latter months of the year. The Close Season for cotton was from April 1st to May 30th, and the majority of the crop was planted in June and July, therefore the heavy bolling period was October and November. During October 14·69 inches of rain were recorded and in November 18·91. For the sixty-one days in these two months there were only two on which rain did not fall, thus the atmospheric conditions existing at this time were ideal for the growth of parasitic fungi. A glance at the rainfall graph appearing on a subsequent page will show that heavy rainfall is always experienced in the months mentioned, and if bolls are maturing and ripening at this time a heavy toll of them will be taken by soft rot. As pointed out before, the obvious thing is to plant so that the maturing of bolls will take place during the drier months of the year. The question of planting cotton later than is now done is being considered by the local Chamber of Agriculture and Commerce. At the time of writing, no decision has been arrived at. Before leaving the question of damage done to bolls by soft rot, the following figures with actual counts of diseased bolls may be put forward :—

	% infestation.		% infestation.
Week ending October 7th	18	Week ending October 14th	62
,, ,, ,, 21st	83	,, ,, ,, 28th	57
,, ,, November 5th	34	,, ,, November 12th	49
,, ,, ,, 19th	71	,, ,, ,, 26th	42

In the following table the areas under Sea Island cotton for the past decade are given, with the return per acre, etc.

TABLE III.

Crops.	Area planted, acres.	Weight of lint, lb.	Weight of lint per acre, lb.
1919–20	5,079	475,650	93
1920–21	6,453	614,508	95
1921–22	2,906	278,744	93
1922–23	3,562	575,640	161·6
1923–24	3,387	473,248	139·7
1924–25	3,294	449,295	136·5
1925–26	4,893	585,483	119·7
1926–27	6,156	507,240	82
1927–28	3,364	328,188	97·5
1928–29	3,386	Unknown	Unknown

It is too early to say what the return for the season 1928–29 is, as ginning operations have not been completed.

Following the procedure adopted in previous years the annexed (Table IV) has been compiled. It shows the amounts of Sea Island cotton exported for the periods indicated.

TABLE IV.

Years.	Export of lint, lb.
1919	484,097
1920	494,871
1921	302,168
1922	338,279
1923	585,143
1924	520,368
1925	473,219
1926	588,793
1927	446,274
1928	349,246

The Sea Island cotton exported from St. Vincent during the year 1928 was valued at £28,549.

The exports of Marie Galante cotton for 1928 was 36,214 lb. of lint and 35,858 lb. of seed cotton; converting seed cotton into lint, this work out at approximately 45,178 lb. of lint valued at £1,670.

Cacao Industry.

The cacao industry in St. Vincent is not as important as in some of the neighbouring islands. Broadly speaking, the conditions existing are not suited to the general well being of the crop. In spite of this, cacao is grown in the majority of peasant holdings, the trees in some cases merely existing. Cacao plays an important part in the domestic economy of the peasant, providing as it does the source of a popular and nutritive drink.

The following gives the amount of cacao exported during the past decade :—

Year.	Weight lb
1919	219,545
1920	168,594
1921	139,135
1922	137,349
1923	121,374
1924	138,910
1925	154,821
1926	174,599
1927	135,490
1928	179,918

According to Treasury figures the cacao exported in 1928 was valued at £2,298 or at the rate of approximately 4d. per lb.

Starch.

Some twelve months ago, the St. Vincent Arrowroot Growers' Association inaugurated, through the medium of the West Indian Committee, a campaign to advertise St. Vincent Arrowroot in England. Mr. Thomas Souness was selected as Special Investigating Officer by Sir Algernon Aspinall, Secretary, West India Committee. Subsequently, Dr. J. Campbell was appointed Honorary Scientific Advisor to the St. Vincent Arrowroot Growers' Association; Mrs. Ettie Hornibook is a co-worker with them. Early in 1929 the Empire Marketing Board gave a grant to assist in the campaign, which was the result of negotiations instituted by Sir A. Aspinall. It is not proposed to discuss here the procedure adopted to popularise arrowroot but it should be said that every effort, in many and varied directions, is being made to increase the demand and consumption of this commodity. If this is to be crowned with the success it deserves, planters will have to help at this end and put on the market arrowroot, in standard packages, as is required. If this is not done it will vitiate all the work that is being carried out on their behalf. This point has been stressed by the Department in a résumé in a Report written by Dr. Campbell and Mr. Souness, which was sent to practically every arrowroot grower in the island, to Libraries and to the local press and Clubs. The matter was discussed at Exhibition Committee meetings and the importance of it was brought to the notice of the Arrowroot Growers' Association by correspondence.

There still remains, unsold, on the English market fair quantities of arrow-

root, but there is every reason to believe that the demand for it in that country is improving. There were 3,870,420 lb. exported from the Colony during 1928. Of this the United Kingdom took 1,933,436 lb., the United States some 1,408,672 lb. The next best customer for arrowroot was Canada which took 239,171 lb., and this was followed by Barbados with 130,491. Germary absorbed 34,956 lb., France 23,529 lb. and Holland 22,400. The remainder was shipped to British Guiana and nine West Indian islands. In the past, growers of arrowroot were perturbed by the fact that the production of this commodity was greater than the demand. Until recently the majority of arrowroot was shipped to England, but there is now proof that the consumption in the United States is steadily increasing, and this is relieving a condition that at one time was a decidedly serious one.

The following table clearly proves this statement:—

TABLE.

EXPORT OF ARROWROOT TO THE UNITED STATES OF AMERICA.

Year.	Quantity exported lb.
1922	55,088
1923	62,852
1924	376,843
1925	649,777
1926	914,379
1927	1,147,096
1928	1,408,672

The following table gives the exports of arrowroot and cassava with their values for the past decade:—

TABLE.

Year.	Arrowroot lb.	Value £.	Cassava lb.	Value £.
1919	2,244,475	42,222	430,465	4,836
1920	2,794,532	52,771	343,309	3,844
1921	2,093,358	21,216	156,888	1,666
1922	2,692,130	26,141	160,333	1,482
1923	2,177,182	31,829	366,085	3,700
1924	2,952,537	51,361	634,631	6,838
1925	3,190,412	53,174	470,284	4,160
1926	3,291,553	45,807	443,075	4,077
1927	3,195,487	53,309	543,681	4,940
1928	3,870,420	64,508	392,610	3,272

Arrowroot was valued at 4d. per pound and cassava at 2d.

In addition to the above there were 13,545 lb. of farine exported. This was valued at £79.

It will be noticed that the quantity of arrowroot exported has increased; this is due to increasing demand in the United States of America. The quantity of arrowroot exported fluctuates from year to year. Planters often hold up supplies awaiting improvement in market prices. Most of our cassava is absorbed by the Trinidad market.

Syrup and Sugar Industry.

During the year 929 tons of sugar, and 167,044 gallons of syrup were exported.

The exports of sugar and syrup for the past ten years are given below:—

TABLE.

Year.	Sugar lb.	Value £.	Syrup Gallons.	Value £.	Total Value. £.
1919	250	3	170,482	10,722	10,725
1920	...	...	185,999	27,828	27,828
1921	322,560	3,514	117,157	9,878	13,392
1922	150,080	1,264	134,784	9,862	11,126
1923	145,944	1,863	275,932	18,711	20,574
1924	22,400	280	261,127	15,578	16,038
1925	...	...	268,118	19,672	19,672
1926	...	...	337,099	16,523	16,523
1927	839,000	6,947	171,063	10,496	17,443
1928	2,081,408	14,193	167,044	9,478	23,671

In the following table, sugar has been equated into terms of syrup, and syrup into terms of sugar, it being estimated that 300 gallons of syrup are equal to one ton of sugar.

TABLE.

Year.	Syrup, Gallons.		Sugar, Tons.
1919	170,512	Equal to	568
1920	185,999	„	619
1921	160,357	„	534
1922	154,884	„	516
1923	295,432	„	984
1924	264,127	„	880
1925	368,118	„	1,220
1926	337,099	„	1,123
1927	283,563	„	945
1928	445,744	„	1,486

The combined value of sugar and syrup was £23,671, that for sugar alone was £14,193, or at the rate of a little less than £15 per ton, that for syrup £9,478 or at the rate of approximately 13·6d. per gallon.

Coco-nuts.

The exports of copra during 1928 showed an increase over that for the previous year of about 25 per cent. Increased areas are annually coming into bearing and several hundred acres are planted yearly. The crop on the whole is healthy, and is assuming a position of considerable importance to the Colony.

TABLE.

Year.	Quantity.			Value.	
1919	Coco-nuts	...	7,000	£ 47	£203
	Copra	...	9,319	156	
1920	Coco-nuts	...	16,448	144	£574
	Copra	...	22,644	430	
1921	Coco-nuts	...	13,399	82	£1,435
	Copra	...	89,005	1,353	
1922	Coco-nuts	...	700	£6 4s. 2d.	£2,440
	Copra	...	223,593	£2,343 13s. 10d.	
1923	Copra	...	356,626		£2,959
1924	Coco-nuts	...	4,841	£ 22	£5,452
	Copra	...	645,973	5,430	
1925	Coco-nuts	...	9,435	20	£5,532
	Copra	...	661,309	5,512	
1926	Coco-nuts	...	20,463	102	£9,928
	Copra	...	762,563	9,826	
1927	Coco-nuts	...	11,383	52	£10,135
	Copra	...	1,198,441	10,083	
1928	Coco-nuts	...	26,703	113	£12,656
	Copra	...	1,505,093	12,543	

From the above it will be seen that copra was valued at £18. 12. 0 per ton.

PROGRESS IN MINOR INDUSTRIES.

Indian Corn (Maize).

The exports of maize were much less than that for the previous year, being 49,982 lb. or 961 bushels. This decrease is more than offset by increased production of sweet potatoes, and in addition, there was a very short corn crop in the Grenadines and these islands absorbed a considerable quantity of what was grown in St. Vincent.

Year.	Export, bushels.
1919	1,327
1920	2,428
1921	1,683
1922	581
1923	4,696
1924	2,766
1925	2,754
1926	1,751
1927	1,901
1928	961

Ground-nuts.

The quantity of ground-nuts exported amounted to 334,098 lb. or in terms of bushels 6,444. This shows an increase of some 1,377 bushels over that sent out during 1927. They were valued at £4,176 or approximately 3d. per lb. The exports for the past decade are given below.

Year.	Export, bushels.
1919	11,329
1920	12,017
1921	5,584
1922	8,336
1923	8,803
1924	6,195
1925	5,251
1926	3,673
1927	5,067
1928	6,444

This crop matures in from 90 to 100 days, and is grown to meet the demand of a neighbouring island. Planters are in intimate touch with these markets and when prices are high larger areas are planted and the demand rapidly met. The same remark applies to the pea crop.

Peas and Beans.

There was more than double the quantity of peas and beans exported during 1928 than during the previous year, and the eason for this was given when ground-nuts was being dealt with. The exportrs amounted to 96,484 lb. or 1,855 bushels and were valued at £877 or a little more than 2d. per lb. The following gives the exports for the past ten years:—

Year.	Export, bushels.	Value £.
1919	2,704	1,392
1920	1,581	952
1921	2,637	1,472
1922	2,731	1,640
1923	2,482	1,595
1924	1,744	984
1925	1,548	866
1926	965	476
1927	745	352
1928	1,855	876

Miscellaneous.

Vegetables to the value of £3,476 were exported; of this quantity sweet potatoes to the value of £2,394 were sent to intercolonial markets. Trinidad alone took potatoes to the value of £2,243. The exports of nutmegs and mace were valued at £1,107, poultry £382, oil £360, fruit £275 and fire wood £260.

Rum Industry.

No rum was exported but 17,700 proof gallons were distilled. Valuing this at 2/6 per gallon, we see that the total is £2,217.

POSSIBLE NEW INDUSTRIES

Manila Hemp (*Musa textilis, Nees*).

A consignment of 331 lb. of Manila hemp was prepared and sent to the Imperial Institute for trial sale. In this there were four grades. The hemp was forwarded by the Imperial Institute to Messrs. Wigglesworth and Co., Ltd., for their opinion as to the quality and commercial value of the material. The firm reported as follows:—

"No. 1 grade is best and is a well grown fibre bright glossy colour, very strong and well selected. A good bold Roping Type. Today's value £45 to £46 per ton.

No. 2 grade is not quite so bright in colour and the fibre is slightly coarser. Here and there are traces of rather brittle fibre, but on the whole it is of good strength. This quality has also not been quite stripped as No. 1. (decorticated). Value £43 to £44 per ton.

No. 3 grade. There is practically no difference between this and No. 2 quality and they could be quite well mixed together. Value about the same.

No. 4 grade. Nice strong fibre of light sandy brown colour, but without much gloss. Bold Roping fibre. Both crop and root ends are rather taily as the fibre is not quite so well prepared as grades 1, 2 and 3. It is quite a good saleable quality however, and we value same at £40 per ton.

Judging from the sample consignment the fibre is of good commercial value to Rope Makers and Binder Twine manufacturers. Outside of Manila and Sumatra it is the best specimen of Manila hemp we have seen, infact in some cases it is much stronger than the Sumatra and approaches the highest standard of Manila for strength". The report goes on to say that commercial quantities would be readily saleable in the London market. The material reported on was sold as one lot at the rate of £37. 10. 0 per ton.

The above clearly indicates that Manila hemp can be successfully grown and prepared in St. Vincent. The cost of cleaning or scutching was high. Some of the labourers only cleaned one pound for a day's work. This was undoubtedly due to the fact that they were untrained ; twenty pounds of fibre is regarded as a good day's work for a trained labourer in the Philippines.

A nursery of from six to seven acres in area of Manila hemp plants has been established to provide plants for persons desirious of growing this crop.

Permanent Exhibition Committee.

This Committee was convened in 1927, and is what may be termed a ricochet of the Committee formed to deal with matters pertaining to the Exhibition held at Wembley during the years 1924 and 1925. Members have worked in close co-operation with the St. Vincent Arrowroot Growers' Association, and the latter body has liberally given grants to the Committee which have been used in the main for advertising arrowroot at various Exhibitions and Fairs. Since the inception of the Committee the Colony of St. Vincent has participated in the following:—The British Industries Fair held in February and March, and the International Grocers Exhibition held in September, 1927. In 1928 St. Vincent took part in the British Industries Fair held in February and March. The Ideal Home Exhibition held in March. The Canadian National Exhibition held in September and in the International Grocers Exhibition which took place in the same month. The details connected with these were in the hands of the West India Committee. In point of fact it would have been quite impossible for this island to take part in these various exhibitions if it had not been for the liberal assistance given by this Body. The Empire Marketing Board has also helped very considerably. Arrowroot was the commodity most extensively advertised, but other products of this Colony were not neglected. A collection of excellent recipes for making various dishes from arrowroot were put together in booklet form by Mrs. Hornibrook, a lady who has given voluntary assistance of a valuable nature at various exhibitions. In addition cooking demonstrations were given; representatives of firms who manufactured biscuits or who were otherwise interested in arrowroot were interviewed. At this juncture it may not be out of place to record further activities that have taken and are taking place in connection with the arrowroot advertising campaign inaugurated by the West India Committee. The diatetic properties of arrowroot are under investigation. It has been observed that arrowroot contains an hitherto unnoticed constituent. The nature of this has not been properly determined but probably, if not an actual vitamin, has an allied action favourably affecting protein nutrition and assimilation. It was found that when combined with a separated dried milk it formed a useful food giving protein and carbo-hydrate material possessing the heighest degree of digestibility. These facts are important and at the time of

writing are being communicated to the Empire Marketing Board and the Trade Commissioners of New Zealand and Canada. It has been proved that the statement found in published works and papers, that arrowroot was specially prone to the absorbtion of foreign flavours was without foundation.

Informative pamphlets for distribution were written and printed. This gave the food value of arrowroot, and its uses in sick room dietary, etc. The Empire Marketing Board consented to publish these in large numbers, and in addition undertook to broadcast arrowroot recipes over the wireless. Numerous sample packages of arrowroot, each containing cooking recipes were distributed at various exhibitions.

The question of manufacture of arrowroot was considered and blue prints of modern machinery with the cost thereof were submitted for the consideration of local planters. Among other matters discussed were those of grading, packing and marketing of arrowroot.

A special article for the medical profession is being prepared and will be published in "The Lancet".

The above does not pretend to include all that the West India Committee is doing for one of St. Vincent's most important industries. It is put forward so that readers can have some idea of its activities in this respect.

AGRICULTURAL INSTRUCTION, EDUCATION AND CO-OPERATION.

The number of Agricultural Credit Societies in the Colony is twenty. One was voluntarily dissolved and the majority did not function. Agricultural Officers paid frequent visits to estates and peasant holdings throughout the year.

Science Teaching.

This is done by the Science Master attached to the Grammar School.

DETAILS OF STAFF AND ADMINISTRATION.

The sum of £1,637 was voted for the upkeep of the Agricultural Department. The following gives details of expenditure :—

	£	s.	d.
Salary, horse and travelling allowance, Agricultural Superintendent	449	12	0
Salaries, Foremen, Botanic and Experiment Stations, Cotton Inspector, Officer in Training and Clerical Assistant, and horse and travelling allowances, Agricultural Instructor and Cotton Inspector ...	476	13	4
Upkeep Botanic and Experiment Stations, (labour, tools, manures, etc.)	533	3	1
Destruction of food plants of the Cotton Stainer ...	14	17	6
Salary, horse and travelling allowance, Government Vaccinating Officer	30	0	0
Other Charges, Government Veterinary Department ...	22	0	0
Special Cotton Investigations	11	6	5
Total	£1,537	12	4

Receipts.

The receipts for sale of plants and produce at the Botanic and Experiment Stations amounted to £98. 1. 4.

Correspondence and Distribution of Information on Agricultural Matters.

The number of minute papers dealt with amounted to 150, the number of letters despatched was 728. In addition 238 Reports, etc., were sent out.

Additions to Library.

In the past a lengthy list of publications received by this Department was embodied in the Annual Report. It is not proposed to insert such a one in this as the list of such is of but little general interest.

METEOROLOGICAL OBSERVATIONS.

The average rainfall for the past 35 years at the Botanic Gardens was 102·53 inches. The rainfall for 1928 was 103·86 inches, slightly above the average.

The following gives the rainfall recorded at the Botanic and Experiment Stations in St. Vincent during the period under report. That for Union Island appears on page 11.

Month.	Botanic Gardens.	Experiment Station.
January	5·22	5·76
February	5·32	4·33
March	4·38	4·44
April	4·33	4·09
May	1·57	1·17
June	8·46	8·79
July	9·48	7·84
August	9·87	9·18
September	13·36	12·02
October	14·69	13·43
November	18·91	16·92
December	8·27	7·31
Total	103·16	95·28

At the Botanic Gardens rain was recorded on 289 days; the heaviest fall was on November 2nd, when 2·74 inches fell. Rain fell at the Experiment Station on 288 days, the heaviest fall was recorded on November 17th, when 2·47 inches were measured.

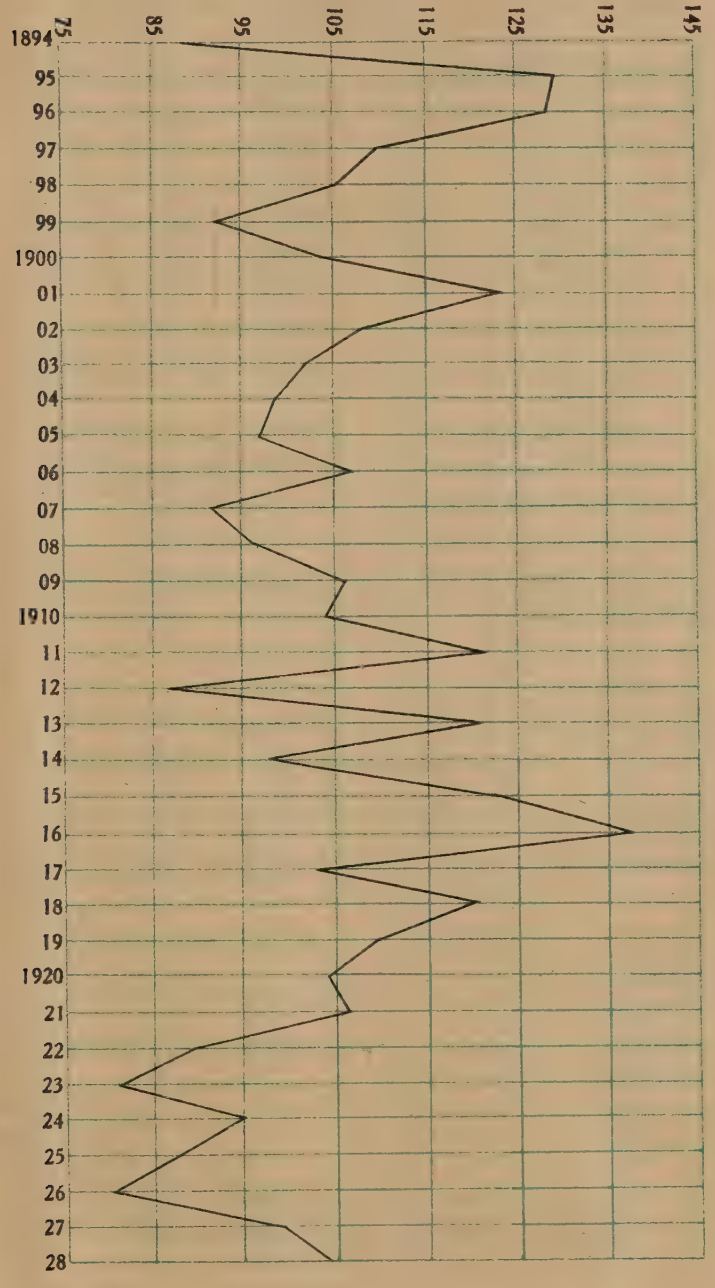
Annual Rainfall Botanic Gardens, St. Vincent, 1894–1928.

See Graph.

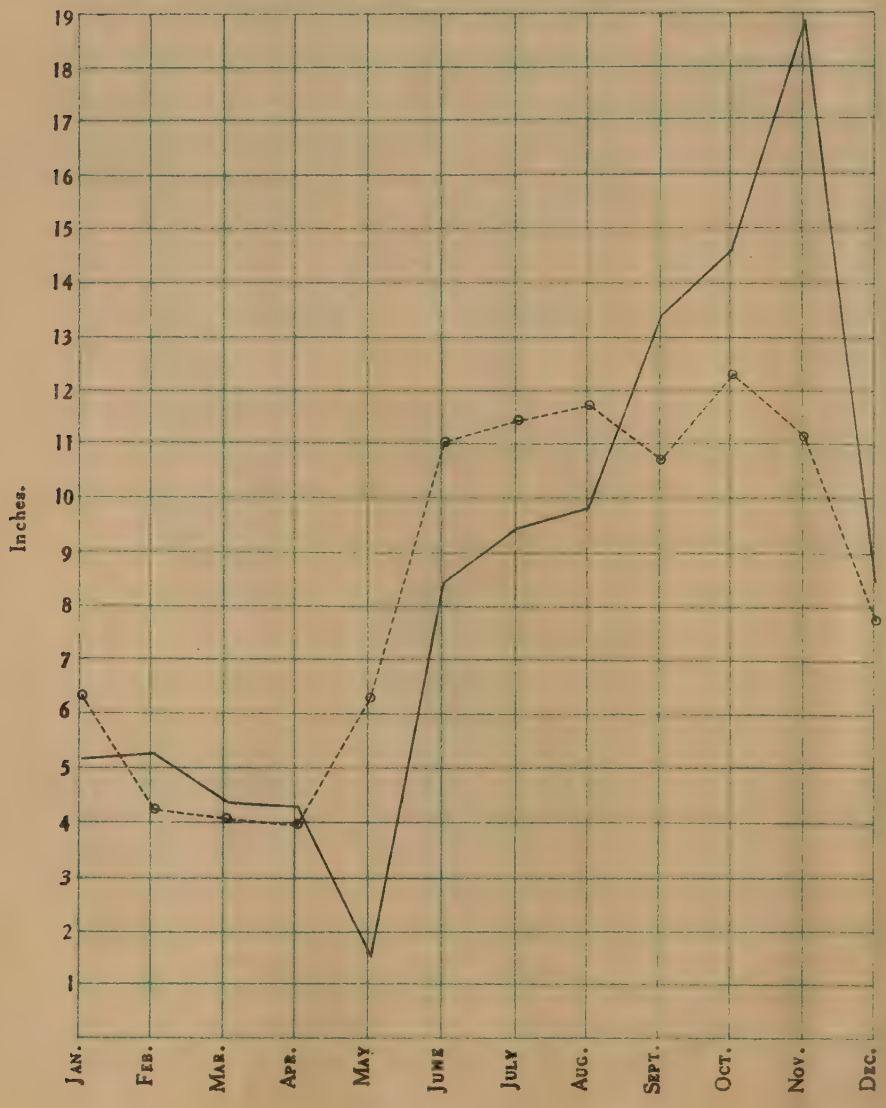
Monthly Rainfall Botanic Gardens, St. Vincent, 1894–1928.

See Graph.

Annual Rainfall, Botanic Gardens, St. Vincent, 1894-1928.



Monthly Rainfall, Botanic Gardens, St. Vincent, 1894-1928.



Black line represents monthly rainfall, 1928.

Dotted line represents mean monthly rainfall, 1894-1928.

The following table gives the mean temperature, average degree humidity, and the mean barometric pressure in inches for each month during the year :—

METEOROLOGICAL OBSERVATIONS, EXPERIMENT STATION, FOR 1928.

TABLE.

Month.	Mean temperature F°.	Average degree of humidity. Saturation 100.	Mean barometric pressure in inches.
January ...	78·5	70·8	29·942
February ...	78·7	61·4	29·986
March ...	78·6	69·2	29·981
April ...	79·4	72·4	29·956
May ...	81·6	72·5	29·969
June ...	80·6	77·0	29·952
July ...	85·6	74·3	29·979
August ...	81·2	74·6	29·951
September ...	81·3	77·6	29·931
October ...	81·0	75·5	29·905
November ...	80·5	78·1	29·888
December ...	78·0	71·4	29·920

ATMOSPHERIC PRESSURE.

The reading of the barometer, corrected for instrumental error, elevation, temperature and latitude, ranged from 30·079 on February 27th to 29·758 on September 12th.

OFFICIAL VISITORS.

On January 19th Mr. A. Collens, F.I.C., Superintendent of Agriculture, Leeward Islands, and Lady Gibbons, on February Mr. Gomez, Curator, Montserrat, on May 27th Dr. C. E. Wardlow, Ph.D., etc., Banana Pathologist, Imperial College of Tropical Agriculture, on July 8th Mr. H. H. Croucher, B. Sc., Imperial College of Tropical Agriculture, and on October 18th Mr. H. A. Ballou, M.Sc., etc., Commissioner of Agriculture, visited the Botanic Gardens.

VETERINARY REPORT.

Microscopic examination of ears of animals for anthrax was performed at the Colonial Hospital.

The total sum expended on Veterinary work was made up as follows :—

	£	s.	d.
Salary and Travelling Allowance, Government Vaccinating Officer	30	0	0
Burial of Carcasses	22	0	0
Total	£52	0	0

ANTHRAX.

No cases of anthrax have been recorded in St. Vincent since 1914.

VACCINATION.

No vaccination was performed during the year. St. Lucia is the only island that requires vaccination certificates when stock from St. Vincent is imported. No animals were exported to the island in question.

Certificates were issued for 1,891 hides and skins shipped to Barbados which were valued at £199, in addition 1,359 hides valued at £213 were exported to Trinidad.

The following table gives the exports of animals.

TABLE A.

Class of Animals.		Number.	Value £.
Cattle	...	6	62
Sheep	...	855	481
Goats	...	1,511	522
Pigs	...	2,340	3,267
Total	...	4,712	4,332

The value of animals exported during 1927 was £1,986. This is given for the sake of comparison.

TABLE B.

Showing number, kind and value of stock for which Veterinary certificates were granted, also the Colonies to which the animals were exported.

Class of Animals.		Barbados.		Trinidad.		St. Lucia.		Grenada.		Total.	
		No.	Value £.	No.	Value £.	No.	Value £.	No.	Value £.	No.	Value £.
Cattle	—	105	805	5	73	48	225	18	53	176	1,156
Horses	—	18	439	1	30	...	...	...	...	19	469
Asses	—	106	335	9	16	...	...	1	2	116	353
Mules	—	12	230	...	...	...	...	...	...	12	230
Sheep	—	...	...	...	...	...	...	4	1	4	1
Goats	—	...	...	...	...	...	...	17	4	17	4
Total	—	241	1,809	15	119	48	225	40	60	344	2,213

IMPORTS.

Nineteen animals valued at £340 were imported for breeding purposes.

TABLE C.

Class of Animals.		Number.	Value. £.
Cattle	...	8	155
Horses	...	2	173
Goats	...	2	5
Pigs	...	7	7
Total	...	19	340

TABLE D.

Showing deaths of animals in districts from natural causes.

District.	Cattle.	Horses.	Asses.	Sheep.	Goats.	Pigs.	Total.
Kingstown —	16	3	2	...	1	9	31
Calliaqua —	2	...	...	1	...	...	3
Mesopotamia —	5	...	2	...	...	...	7
Total —	23	3	4	1	1	9	41

TABLE E.

Showing deaths of animals in each month of the year ended December 31st, 1928.

Months.	Cattle.	Horses.	Asses.	Sheep.	Goats.	Pigs.	Total.
January —	...	...	...	...	...	1	1
February —	1	...	...	...	...	1	2
March —	2	1	...	...	1	2	6
April —	1	1	1	...	...	2	5
May —	4	...	...	...	...	...	4
June —	3	...	1	...	...	1	5
July —	1	...	...	...	...	1	2
August —	3	...	...	...	...	1	4
September —	3	1	...	...	...	...	4
October —	1	...	...	...	...	...	1
November —	4	...	2	...	...	...	6
December —	...	...	...	1	...	...	1
Total —	23	3	4	1	1	9	41

Report on the Agricultural Credit Societies for the Year 1928.

Very little use is being made of the facilities offered by these Societies, and one possible reason is that any peasant with normally good security can, if he requires it, get a loan with ease from the local Agricultural Bank. In addition, most of the members of these Societies are not sufficiently educated to understand the value of co-operation. The St. Vincent peasant has many good qualities, but he does not possess what is termed a "money conscience", and he does not like to be interfered with.

The question of winding up the affairs of some of these Societies should be seriously considered. Under Section 22 of Ordinance No. 12 provision is made for this ; the Section reads as follows :—"The Governor in Council shall have power for such reason as may appear good and sufficient to him at any time to cancel the registration of a society registered under provisions of this Ordinance : Provided that such cancellation shall not be taken to affect the joint and several liability of the Trustees and every member of the society at the time of its dissolution for the repayment of all outstanding loans made to the society during its term of registration". The voluntary dissolution of any society is provided for by Rule 41 made under the authority of the Ordinance previously mentioned. It reads "The Society may at any time be dissolved by the consent of five-sixths of the members testified by their signatures to an instrument of dissolution. Under this Rule, Buccament Society was dissolved during 1928. Five Societies owe money to Barclays Bank. The business of these should not be brought to a finality until they have repaid their loans to the Bank. The Bank's Barrister has this business in hand, the total sum that these five Societies owe is £345. 0. 11, and it is all recoverable. The collecting of this money during 1928 was handicapped by the illness and subsequent death of the lawyer who had this work in hand. His successor is suing trustees and members. Some of the other Societies have small credit balance called Reserve Funds, and some members owe money to these. The worry and trouble caused by these debts are more than they are worth, and they should be written off as bad debts, and the affairs of such Societies brought to a close. A Committee should be formed to do this. No useful purpose is being served by delaying action. The allocating of these small Reserve Funds might cause embarrassment, as the law on this point says, "In no case shall the Reserve Fund be divided ; and should the Society be dissolved it shall be devoted to some useful public purpose in the quarter of the Society or in the immediate vicinity thereof to be determined upon by the meeting at which the dissolution shall be effected". This is not an obstacle that could not be overcome.

Below is given a short account of the affairs of each Society :—

Union Island. This Society owes Barclays Bank the sum of £108. 1. 10½ which is a balance from a debt of £400 contracted in 1921. When the Report for the year 1927 was being written the debt was £130. 17. 4, it has therefore been reduced by £22. 15. 10½. This Society has a membership of 94.

Union. In 1926 a loan of £271 was contracted by Union Society from Barclays Bank. In 1927 the debt was £147. 1. 6, at the present moment it is £102. 13. 1. That is to say the sum of £14. 8. 5 has been paid during the year ; it has a membership of 52.

Spring Village. In 1921 this Society contracted a debt of £221, and in 1927 the amount unpaid was £118. At the present time the unpaid balance amounts to £95. 5. 2, the Society having paid to Barclays Bank during 1928 the sum of £22. 14. 10 towards squaring the debt. This Society has a membership of 53.

Clare Valley, Questelles. The £200 borrowed in 1927 was promptly repaid in 1928, and a loan for £187. 10. 0 was obtained in the letter mentioned year. This Society is the only one in St. Vincent that has always met its obligations promptly. There are two reasons for this. One is that the members are peasant proprietors owning land in one of the most fertile of our land settlements. The second is that the Head of the Wesleyan Church has always held an executive appointment on the Committee of Management, and many of the members of the Society belong to his congregation. This latter fact has, possibly, been the primary one in establishing such a reputation. It has a membership of 54.

Orange Grove. In 1926 a loan of £240 was contracted by Barclays Bank. In 1927 the sum of £200 was paid, leaving a balance of £40. At the time of writing the amount owing is £36. 7. 3, only £3. 12. 9 being paid towards the principal during 1928. The membership is 47.

Barrouallie. This Society in 1921 contracted a loan from Barclays Bank of £202. In 1927 the small sum of £2. 3. 6 was still owing. No attempt was made to repay the amount during the year under report, in fact as interest was unpaid the amount at present is larger, being £2. 13. 7. The membership of this Society is 47.

Georgetown. This Society does not owe the Bank any money, but the loan of £150 mentioned in the 1927 Report as having been obtained from a private individual, was renewed. This Society has 89 members.

Troumaca. In 1926 this Society obtained a loan of £100 from a Provident Society, and £90 from a Temperance Society. These were repaid in 1928, and loans for similar sums of money from the same sources were obtained. This Society has 56 members.

The following Societies did not contract any loans during the year :—Redemption, Biabou, Marriaqua, Calliaqua, Harmony Hall, Belair-Gomea, Stubbs, Chateaubelair, Bequia, Layou, Lowmans and Canouan. All loans obtained by these in the past have been repaid.

Statement of Transactions.

In Reports previously published a somewhat lengthy table appeared under the hearing "Statement of Transactions." This showed the date of registration of all Societies, total number of members during the year, loans contracted in year, and total loans obtained since registration to end of year. Much of this information has already been put forward and it is proposed to insert the following short table in place thereof :—

Loans obtained in 1928	£	527 10	0
Total loans obtained by all Societies since their inception ...		36,155 10	0

Comparative Statement Showing how Loans were Obtained.

It is not proposed to publish the table which usually appeared in this section of the Report under the heading "Comparative Statement Showing how Loans were Obtained". Any person particularly interested can refer to the 1927 Report; this when read in conjunction with the following statement gives all details :—

From where obtained.	Loans obtained in 1928.	Rate of interest per cent.
Barclays Bank ...	£ 187 10 0	7
Private Individual (Renewal) ...	150 0 0	8
Provident Society ...	100 0 0	6
Temperance Society ...	90 0 0	6
Total	£ 527 10 0	

Summary.

*The loans repaid during the year amounted to ...	£	633 10	$4\frac{1}{2}$
*The total loans obtained since these Societies were registered to December, 1928		3,6155 10	0
Interest on loans during 1928 . ..		41 2	0
*Loans outstanding other than those contracted during 1928		685 0	11

*The sum of £150, being the renewal of a loan in 1928, is included in these figures.

REPORT ON THE WORKING OF THE GOVERNMENT COTTON GINNERY FOR THE PERIOD 1ST OCTOBER, 1927 TO 30TH SEPTEMBER, 1928.

The following section was prepared by the Manager of the Government Cotton Ginnery :—

Ginning and Baling.

The total quantity of seed cotton received for ginning was 740,489 lb., which consisted of 614,984 lb. white Sea Island and 125,505 lb. stained. The lint obtained was 162,038 lb. white and 33,049 lb. stained, giving a total of 195,087 lb. The figures for the previous season were 1,026,537 lb. white and 275,244 lb. stained seed cotton, which yielded 273,289 lb. and 72,186 lb. respectively, or a total of 345,475 lb. of lint. The seed cotton was therefore only 56.8% of the previous year's receipts. The two principal causes for the large decrease were a considerable reduction of the area under cotton cultivation and unfavourable weather conditions.

The Committee of Management considered a request from the Kingstown Cotton Factory for the putting into square bales of some of the lint obtained from cotton ginned at that Factory and put into cylindrical bales. The request was complied with and 94 bales of lint were accordingly re-baled for the purpose of effecting saving on freight.

Oil Expressing and Refining.

Oil was expressed from 748,814 lb. of cotton seed, which included the prime seed from cotton ginned at the Kingstown Cotton Factory. The quantity of seed from which oil was expressed during the 1926-27 season was 1,082,387 lb.

The crude cotton seed oil was refined by the ginnery and yielded 7,175 gallons, all of which was sold locally although prices had to be reduced in order to meet competition from Soya Bean Oil.

The residue from the oil refining kettle was used for soap-making. 6,784 bars weighing approximately 12,000 lb. were manufactured and sold.

Purchase of Cotton on the Co-operative System.

The advances made on Sea Island cotton for the 1927-28 crop were 6 cents per lb. on white and 2 cents per lb. on stained seed cotton. 218,052 lb. of white and 31,396 lb. of stained cotton were purchased, and the respective yields of lint were 57,680 lb. and 8,188 lb., making a total of 65,868 lb. During the 1926-27 season 360,388 lb. of white and 91,005 lb. of stained seed cotton were purchased—a total quantity of 451,393 lb. as compared with 249,448 lb. for 1927-28. The purchases for the year under review were therefore 55% of those for the previous one, but it must be borne in mind that, in addition to the conditions referred to at the end of the first paragraph of this report, the 1926-27 purchases should be regarded as rather abnormal, since the ginnery was the only purchaser of peasant's cotton during the greater portion of that season.

In December, 1927, an offer of 44 cents per lb. was accepted for all the white lint (217 bales) which at that time remained unsold. These included 9 bales from the 1923-24 crop, 7 from 1924-25 and 13 from 1925-26. As the advance made on the 1926-27 cotton was 10 cents per lb. of white seed cotton, no bonus could be paid for that season. There were 31 bales of white lint unsold at 30th September, 1928, but these have been disposed of since that date. All advances made by the Treasury were paid at the end of the year.

Purchase of Corn on the Co-operative System.

There was very little corn offered for sale to the ginnery. The cultivation of this product was rather restricted in St. Vincent for the season, while the crop in the islands of the Grenadines proved an absolute failure on account of a prolonged drought, consequently the greater portion of that grown in St. Vincent found a very ready market in the Grenadines at remunerative prices, and therefore there was little necessity to sell to the ginnery for kiln-drying and storing with the view to obtaining a favourable market. Normally, the corn grown in the Grenadines is dried and kept by the inhabitants of those islands for home use, and it generally meets their requirements until about the month of March when they turn to St. Vincent for supplies from that grown in St. Vincent, purchased and stored by the ginnery, which usually amounts to about 50 tons.

The very small quantity of 12,516 lb. of grain was purchased—no corn on the cob was offered. The 1926-27 purchases were 99,929 lb. of shelled corn and 37,933 lb. on the cob.

A bonus of 33·3% was paid on the 1926-27 crop in November, 1927; and in April, 1928, a bonus of 90% was declared on that for 1927-28 which found very ready sale.

Other Transactions.

Corn, other than that purchased, received for storing in the moth-proof rooms of the ginnery amounted to 9,018 lb. The quantity kiln-dried was 11,388 lb., while 14,147 lb. were ground into meal or stock-feed and 1,473 lb. on the cob were shelled.

In addition to the stained cotton seed obtained from cotton ginned at this ginnery, 57,302 lb. received from the Kingstown Cotton Factory were disintegrated for use as manure. 13,971 lb. of cotton seed were selected and disinfected for sale to peasants and estate proprietors for planting, and 2,689 lb. were selected without being disinfected. Fumigation of empty bags was carried on as usual.

General.

Miss D. Wall of the Agricultural Department was appointed Secretary to the Committee of Management from 1st January, 1928, in place of Mr. V. D. Archer who could no longer conveniently perform the duties in consequence of a change in his substantive appointment. At a meeting held on 14th January, 1928, the Committee of Management expressed their high appreciation of the satisfactory manner in which the duties of Secretary had been performed by Mr. Archer and their regret in losing his services. C. E. Best, Chief Mechanic, was dismissed on 14th January, 1928, and his place was filled by Simeon Jack, 2nd Mechanic.

A Simon's Patent Heater which was imported towards the close of the previous season was installed for use in the treatment of cotton seed for the destruction of pink boll-worm. The machine worked quite satisfactorily throughout the season, and the seed from the Kingstown Cotton Factory was heated in it in addition to all that from cotton ginned by this ginnery. The seed was formerly fumigated with Carbon Bisulphide in the moth-proof rooms of the ginnery.

As a result of recommendations made to the Government by Mr. Rankin, two Fuel Oil Heater Tanks were obtained for use with the "Blackstone" engines at the ginnery with a view to effecting economy in the use of fuel. The tanks are attached to the exhaust pipe of the engines and the fuel is heated by the exhaust heat. As the heating does a certain amount of thinning of the fuel oil besides putting it in a better condition for combustion, a heavier, and therefore cheaper, fuel can be used with the heater tanks, although more frequent cleaning of the engines is necessary. These tanks were obtained towards the close of the season and installed at the commencement of the 1928-29 season; it is therefore too early to make definite report on the results of their use, but the matter will be referred to in next report.

The following is a summary of the transactions for the last two years :—

	1926-27.	1927-28.
Seed Cotton received and ginned	1,301,781 lb.	740,489 lb.
Cotton Seed expressed -	1,082,387 „	748,814 „
„ „ disintegrated -	254,612 „	147,888 „
Seed Cotton purchased -	451,393 „	249,448 „
Corn purchased - -	130,276 „	12,316 „
Corn kiln-dried - -	122,084 „	11,388 „
Corn shelled - -	40,896 „	1,473 „
Cotton Seed selected and disinfected for planting - -	13,143 „	13,971 „
Cotton Seed selected only -	...	2,689 „
Grain, &c., fumigated and stored -	19,259 lb.	9,018 „
Corn ground into meal or stock-feed	36,456 „	14,147 „
Cotton Seed Oil refined -	9,500 galls.	7,175 galls.
Soap manufactured -	5,000 bars	6,784 bars
Cotton Seed Meal delivered -	500 tons.	320 tons.